

## REMARKS

### **1. Claim Status**

Claims 28-29 have been cancelled. Claims 31-32 have been added. Claims 1-2, 7, 21, and 27, and 30 have been amended. Claims 1-12, 15-27, and 30-32 are pending.

### **2. Amendments**

The amendments to claims 1, 2, and 7, 21, and 27 do not constitute new matter; support for the amendments may be found in the specification on page 13, line 17 to page 14, line 2. The amendments to claim 30 merely serve to fully clarify the nature of the ammonium ions recited therein, are fully supported in the specification (page 13-14), and do not constitute new matter, nor do they change the scope of the claims in any way. Support for new claims 31-32 may be found in the specification on page 13, line 17 to page 14, line 2, and thus new claims 31-32 do not present new matter.

The amendments to the specification merely serve to rectify inadvertent typographical errors and to fully clarify the nature of the invention by adapting chemical names to follow IUPAC nomenclature guidelines. The amendments do not constitute new matter. Applicants note that the specification, on page 13, line 20, clearly delineates that the recited compounds are organic cations, and further note that “[a]n amendment to correct an obvious error does not constitute new matter where one skilled in the art would not only recognize the existence of error in the specification, but also the appropriate correction.” *MPEP 2163.07(II)*. Thus the amendments to the specification do not constitute new matter.

### **3. Claim Objections**

The Office Action has objected to Claims 28 and 30. Applicants note that Claim 28 has been cancelled, thus obviating its rejection, but further note that new Claim 32 refers to those compounds recited in cancelled claim 28. Specifically, the Office Action has objected to the recitation of “octadecyl trimethyl amine” under the assertion that it is a neutral compound and

not an ammonium ion. Applicants respectfully traverse this assertion. One of ordinary skill in the art would clearly recognize this compound to be an ammonium ion. Specifically, one of skill in the art would recognize that any nitrogen with four substituents (here, three methyl groups and one octadecyl group), would necessarily be an ammonium ion, carrying a net positive charge of  $^{+1}$ . Furthermore, the specification, on page 13, line 20, notes that this compound is an organic cation. Nevertheless, in order to fully clarify the nature of the recited compound and to use proper IUPAC nomenclature, Applicants have amended the specification and claims to recite “octadecyl trimethyl ammonium ion.”

The Office Action has further objected to the amine compounds listed in Claim 30. Applicants have amended claim 30 to recite “protonated aminododecanoic acid or protonated polyoxyethylene decyloxypropylamine.” Applicants note that the specification, on page 13, line 20, refers to aminododecanoic acid and polyoxyethylene decyloxypropylamine as organic cations; as amended, Claim 30 more appropriately denotes the nature of these compounds.

The Office Action has objected to Claim 30 for the recitation of polyoxyethylene decyloxypropylamine as a primary amine. Applicants note that Claim 30 as amended does not recite “primary alkyl ammonium ion.”

Based on the above, Applicants respectfully request reconsideration and withdraw of the recited objections.

#### **4. Claim Rejections Under 35 USC § 102(e)**

The Office Action has maintained a rejection of Claims 1-9, 12, 13, and 17-21 under the assertion that they are anticipated by Lan et al. (US 6,262,162). Applicants note that Claim 13 was previously cancelled, and presume its rejection under 102(e) in the Office Action represents an inadvertent typographical error.

Applicants have amended Claims 1, 2, 7, and 21, and thus their dependent claims, to recite “wherein the at least one surface modifier is a singly charged organic cation.” Lan *et al.*, teaches the use of multi-charged onium ions, whereas the claims as presently amended recite only surface modifiers having a single charge. Lan neither teaches nor suggests singly charged surface modifiers. In fact teaches, Lan teaches away from presently pending Claims 1, 2, 7, and

21 in asserting that the use of multiply-charged onium ions, in comparison to singly-charged analogs, leaves more room for co-intercalation of an oligomer or polymer (see, e.g., column 1, lines 48-52 of Lan) and provides for the use of less spacing/coupling agent (see, e.g., column 4, lines 4-6). Additionally, Lan specifically distinguishes compositions comprising singly-charged ammonium or phosphonium ions (see, e.g., column 12, lines 36-43), asserting that the composition disclosed in Lan are more suitable for polymer-clay nanocomposite preparation through an in-reactor route or a direct compounding route.

Thus, as Lan fails to teach each and every limitation of the pending claims, it is not a proper anticipatory reference under 35 USC §102. Applicants therefore respectfully request the Examiner reconsider and withdraw the rejection of Claims 1-9, 12, and 17-21 over Lan *et al.*

## 5. Claim Rejections Under 35 USC § 103

(A) The Office Action has rejected Claims 10-13 and 15-21 under the assertion that they are unpatentable over Lan in view of Moorman (US 5,319,014). Applicants respectfully traverse this assertion. Applicants first note that Claim 13 has previously been cancelled, and presume its rejection under 103(a) in the Office Action represents an inadvertent typographical error. Applicants further note that the Office Action fails to discuss Lan or Moorman individually or in combination, or how the references relate to the rejected claims. “The examiner bears the initial burden of factually supporting any *prima facie* conclusion of obviousness. If the examiner does not produce a *prima facie* case, the applicant is under no obligation to submit evidence of nonobviousness.” MPEP 2142. The Office Action has merely set forth a rejection without anything further to support a *prima facie* case obviousness and as such has failed to meet the burden of the Office. Thus Applicants are under no obligation to refute the assertion of the Office that Claims 10-12 and 15-21 are unpatentable over Lan in view of Moorman.

Nevertheless, Applicants contend the combination of Lan and Moorman cannot establish a *prima facie* case of obviousness. In order to establish a *prima facie* case of obviousness, the prior art references must teach or suggest all the claim limitations, there must be some suggestion or motivation to combine the reference teachings, and there must be a reasonable expectation of

success. Applicants note that Lan does not teach or suggest all the claim limitations of the present application, and that these deficiencies are in no way cured by Moorman, which teaches a methacrylate based composition containing micron-sized particles. Moorman does not teach or suggest, for example, the use of singly charged organic cation surface modifiers. Furthermore, there is no motivation to combine Lan with Moorman. Lan teaches the preparation of nanocomposites while Moorman teaches instead a more conventional composite containing micrometer-sized particles. As noted in the instant application (page 7, line 20 to page 8, line 9), the properties of composites such as those taught by Moorman are in stark contrast to nanoparticle based compositions. Thus one of skill in the art would not be motivated to combine the two references, which teach vastly different compositions of matter. For the same reasons, there would be no reasonable expectation of success in combining the references.

Thus, as the combination of Lan and Moorman does not satisfy even one of the three prongs of a *prima facie* case of obviousness, Applicants respectfully request the Examiner reconsider and withdraw the rejection of Claims 10-12 and 15-21 under 35 U.S.C. § 103(a).

**(B)** The Office Action has rejected Claims 22-26 under the assertion that they are unpatentable over Lan in view of Gauzauskas (US 6,433,037). Applicants respectfully traverse. In order to establish a *prima facie* case of obviousness, the cited references must teach or suggest all the claim limitations. For the reasons discussed above, Lan does not teach or suggest all the claim limitations of the present applications. These deficiencies are in no way cured by Gauzauskas, which teaches a molding composition of fiber reinforced acrylic. The combination of Lan and Gauzauskas neither teaches nor suggests the nanocomposites of the presently pending claims (*i.e.* nanocomposites comprising a plurality of silicate platelets and at least one surface modifier ion-exchanged to each of the plurality of silicate platelets, wherein the at least one surface modifier is a singly charged organic cation), nor their use in dental applications. Thus Gauzauskas does not cure the deficiencies of Lan. As the combination of Lan and Gauzauskas does not teach or suggest all the claim limitations of the instant invention, a *prima facie* case of obviousness cannot be established. Hence the Applicants respectfully request the Examiner reconsider and withdraw the rejection of Claims 22-26 under 35 U.S.C. § 103(a).

**(C)** The Office Action has rejected Claims 14, 29, and 30 under the assertion that they are unpatentable over Moorman in view of Kawasumi (US 4,810,734). Applicants respectfully

traverse this assertion. Applicants first note that Claim 14 has previously been cancelled, and presume its rejection under 103(a) in the Office Action represents an inadvertent typographical error. Applicants further note that Claim 29 has been cancelled in the instant response, thus obviating its rejection. With regard to Claim 30, Applicants acknowledge that Kawasumi teaches the use of aminododecanoic acid in the preparation of a composite material of layered silicate and clay mineral, but contend that a *prima facie* case of obviousness cannot be established as one of skill in the art would not be motivated to combine Lan and Kawasumi. As discussed in Section 5 of the instant response, Lan specifically distinguishes from the use of singly charged cations such as aminodocecanoic acid, and thus provides no motivation for, but rather specifically teaches away from, the use of the compounds disclosed in Kawasumi. Thus, as as one of skill in the art would not be motivated to combine Lan and Kawasumi, a *prima facie* case of obviousness cannot be established. Hence the Applicants respectfully request the Examiner reconsider and withdraw the rejection of Claim 29 under 35 U.S.C. § 103(a).

(D) The Office Action has rejected Claims 27-30 under the assertion that they are unpatentable over Lan in view of Bragodia (US 6,586,500). Applicants respectfully traverse this assertion. Applicants first note that Claims 28-29 have been cancelled in the instant response, thus obviating their rejection. With regard to Claims 27 and 30, Applicants acknowledge that Bragodia teaches generally the use of organic cations in the preparation of a polymer-clay nanocomposite, but contend that a *prima facie* case of obviousness cannot be established as one of skill in the art would not be motivated to combine Lan and Bragodia. As discussed in Section 5 of the instant response, Lan specifically distinguishes from the use of singly charged cations, and thus provides no motivation for, but rather specifically teaches away from, the use of such cations as they are disclosed in Bragodia. Thus, as one of skill in the are would not be motivated to combine Lan and Bragodia, a *prima facie* case of obviousness cannot be established. Hence the Applicants respectfully request the Examiner reconsider and withdraw the rejection of Claims 27 and 30 under 35 U.S.C. § 103(a).

## CONCLUSION

Applicants respectfully submit that the rejections of the pending claims have been overcome by amendment or traversed by argument and that the pending claims are now in condition for allowance. If the Examiner believes it to be helpful, the Examiner is invited to contact the undersigned representative by telephone at (312) 913-0001.

Respectfully submitted,  
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